

Methodological guidelines



Accounting principles and objectives



The not-for-profit Association Bilan Carbone (ABC) has provided support for the Bilan Carbone® tool in France and abroad since 2011. Bringing together partners from the public and private sectors, ABC works to develop the Bilan Carbone® tool and the GHG management system (SM-GES®) with a particular focus on a managerial and strategic approach.

ABC and its partners build and disseminate methods and operational solutions to reduce greenhouse gas emissions and support the transition to a low-carbon society.

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The Bilan Carbone® method and tool were originally developed for the French Environment and Energy Management Agency (ADEME) by Jean-Marc Jancovici, principal of the Manicore consulting firm.

Bilan Carbone® Version 8 was developed by the ABC working group *Evolution of the Method* over the period from January 2016 to August 2017.

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Foreword

Reminder

The name Bilan Carbone® refers to the **methods developed by ADEME and Association Bilan Carbone (ABC)** to enable organizations and local government authorities (respectively Bilan Carbone® and Bilan Carbone® Territoire) to address, measure and reduce their greenhouse gas emissions.

The name Bilan Carbone® also applies to the spreadsheets and user handbooks published by ABC so that users can carry out the necessary calculations.

The inventory of an activity or to a territorial entity yields results called the "carbon footprint", based on the audit of greenhouse gas emissions drawn up using this method.

These guidelines outline the principles underpinning the method and the stages of implementation of the Bilan Carbone® inventory. The tool is meant to be updated as carbon accounting progresses and evolves.

Training is necessary to be able to use the Bilan Carbone® method. Training sessions are provided by the partner organizations listed on the ABC website.¹

ABC encourages Bilan Carbone® users to become members of the association, which ensures them regular updates of the tool and gives access to other related services (see the ABC website for details).

New features in Version 8

Version 8 of Bilan Carbone® introduces a flexible methodology, giving users a guide to excellence that will enable them to set up a process for continual progress and to develop a GHG emissions reporting system. This methodology enriches GHG accounting through a strategic analysis of the reporting organization and suggests best practices for action plans.

Bilan Carbone® tools have also evolved. A new utility for managing activity data makes it easier to document and monitor the organization's data. The master spreadsheet has been simplified and now includes export options for the CDP and the most recent version of ISO 14064-1:2017. New emission factor tabs make it easy to add custom factors, and a new action plan management utility enables users to develop and enrich their assessment and track their results.

Users must explicitly state the module and version number used when communicating their Bilan Carbone® results, for all versions.

¹ Website: <https://www.associationbilancarbone.fr/se-former>

Introduction

What the Bilan Carbone® process aims to do

The IPCC Fifth Assessment Report (AR5) confirms the existence of anthropogenic climate change. GHG emissions due to human activity are higher than they have ever been in the past.² The greater atmospheric concentrations of GHG lead to global warming: on current trends the increase will be +2°C in 2050 and +4°C in 2100 compared to the period 1986-2005. In its AR5 report the IPCC underscores the consequences of this warming, phenomena that include rising sea levels and more frequent natural disasters, as well as diminishing water resources, lower agricultural productivity, and greater risk of conflict.

To address these challenges, the Paris Agreement was drafted at the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change (COP21 – UNFCCC). The agreement aims to reduce human-induced GHG emissions in order to hold the increase in global temperatures to +1.5°C over preindustrial times. France has adopted an Energy Transition for Green Growth Act, targeting energy use, as most GHG emissions are due to the use of fossil fuels. The transition to low-carbon energy resources and greater energy efficiency are both necessary to address climate warming.

All organizations have a role to play to mitigate climate warming and prepare for the world of tomorrow. This combat is a part of the trend to achieve greater Corporate Social Responsibility (CSR), a commitment made by more and more organizations in all areas of society.

Carbon accounting is an instrumental tool for this task, enabling organizations to identify sources of GHG emissions and then reduce them. Once the emissions have been quantified an organization can communicate them as part of a reporting process, and draw up an action plan to address this issue. This action can pursue two complementary objectives: measures to reduce emissions, and measures to adapt to climate change in order to limit its consequences and negative effects.

Bilan Carbone® establishes a standard of excellence in GHG accounting; this tool is designed to compile an exhaustive inventory of GHG emitted by an organization, an event or a project. Bilan Carbone® is also an environmental management tool, serving as a guide and supporting resource for organizations as they develop their climate and energy transition action. Bilan Carbone® is specifically coordinated with the GHG management system SM-GES® developed by ABC to ensure ongoing improvement through action plans.

Other existing methodologies are compatible with Bilan Carbone®, notably ISO 14064-1-2-3:2006;³ ISO 14069:2013;⁴ and national regulations.⁵ Bilan Carbone® tools meet their requirements and can be used with these standards.

² http://www.ipcc.ch/publications_and_data/publications_and_data_reports.shtml

³ <http://www.iso.org/iso/fr/iso14000>

⁴ <http://www.ghgprotocol.org>

⁵ For regulations in France, see <http://www.developpement-durable.gouv.fr/Methodes-d-etablissement-des-bilans>

Main principles of the Bilan Carbone® methodology

To obtain the highest level of excellence in reporting, the Bilan Carbone® process is based on the following principles:

- **Focus** The process is centred on needs.
- **Accuracy** Bias and uncertainty are held to a minimum.
- **Completeness** The inventory strives to cover the broadest possible range of emissions.
- **Relevance** The inventory looks at the emissions categories that are relevant for the organization.
- **Transparency** The inventory must be sufficiently clear to enable informed decision-making.
- **Verification** The inventory must produce verifiable results.

Likewise Bilan Carbone® allows users to conduct a strategic analysis of their GHG emissions. In this respect the methodology incorporates the following principles:

- **Low-carbon strategy:** the process is designed to introduce the concept of emissions reduction into organization strategy;
- **Long-term vision:** the process helps define a long-term vision for the organization's low-carbon transition;
- **Anticipation:** the process encourages users to anticipate coming change and its consequences on the organization's operations, due notably to vulnerability to climate change and to energy dependence factors;
- **Pragmatism:** the process calls for a pragmatic approach to results that are not always what was initially expected.

Use of the Bilan Carbone® logo is contingent on accepting and applying these principles.

Terms and definitions

- **Greenhouse gases (GHG):** natural or anthropogenic gaseous compounds in the atmosphere that absorb and re-emit radiation of specific wavelengths in the infrared range emanating from the Earth's surface, through the atmosphere and clouds. These properties cause the greenhouse effect.

Water vapour (H₂O), carbon dioxide (CO₂), nitrogen oxide (N₂O), methane (CH₄) and ozone (O₃) are the greenhouse gases naturally present in the Earth's atmosphere.

The Montreal Protocol lists many other greenhouse gases of human origin, such as halocarbons and other compounds containing chlorine or bromine. The Kyoto Protocol covers CO₂, N₂O, CH₄, SF₆, NF₃, HFCs and PFCs (see IPCC Fifth Assessment Report on Climate Change 2013, The Physical Science Basis, p. 1455).

- **CO₂ equivalent (CO₂eq):** unit of measure used to state the radiative forcing of a GHG compound as compared to that of carbon dioxide; the radiative forcing of a given GHG is the molecular mass of the compound multiplied by its global warming potential (GWP), a coefficient calculated by the IPCC (see standard NF-ISO 14064-1:2006).
- **Emission category:** breakdown of GHG emissions by type. Emissions are characterized as either direct and indirect emissions.
- **Carbon offsets:** mechanisms designed to fully or partly offset the GHG emissions of an organization. They may be implemented directly by a process or action outside of the organization's operational scope, or indirectly by purchasing carbon credits that represent GHG emission reductions achieved by a third party (see standard NF-ISO 14069:2013).
- **Verifiable data:** data that can be verified through documentation or other proof.
- **Direct GHG emissions:** stationary and mobile sources of GHG emissions that are under the control of a corporate entity or organization (see standard NF-ISO 14064-1:2006).
- **Indirect GHG emissions:** GHG emissions that are the consequence of activities pursued by a corporate entity or organization, even though the GHG sources are controlled by other entities (see NF-ISO 14064-1:2006).
- **GHG emission or removal factor (EF):** coefficient applied to activity data to quantify GHG emissions or removals linked to activity (see standard NF-ISO 14064-1:2006).
- **Standard NF-ISO 14064-1:2006:** standard stating the principles and requirements applicable to organizations for quantification of GHG emissions and for drafting reports on emissions and emission removals, compiled by the International Organization for Standardization (ISO).

- **Organization:** a corporate entity, company, firm, enterprise, authority, institution, or part of such an entity, or a combination of entities, constituted as a capital corporation or in other legal form, under public or private law, that possesses its own administrative and operational structures (see standard NF-ISO 14064-1:2006).
- **Operational scope:** all sources of GHG emissions covered in the carbon accounting of an organization.
- **Organizational scope:** all sites, installations and functions covered in the carbon accounting of an organization.
- **Emission categories:** GHG emissions grouped according to source (same or similar types of sources). An emission category may be designated as an "emission sub-category" (see Method for compiling greenhouse gas emission inventories, version 4).
- **Global warming potential (GWP):** coefficient used to state the radiative forcing of a GHG by unit of mass compared to an equivalent unit of CO₂, over a given period of time (see Method for compiling greenhouse gas emission inventories, version 4).
- **GHG profile:** list of sources of GHG emissions and the associated emission quantities.
- **GHG sink:** process that removes a GHG from the atmosphere (see standard NF-ISO 14064-1:2006).
- **Activity data:** quantitative measure of a given activity that causes GHG emissions (see standard NF-ISO 14064-1:2006).
- **GHG source:** physical entity or process that releases a GHG to the atmosphere (see standard NF-ISO 14064-1:2006).
- **Transition risks and opportunities:** risks incurred and/or opportunities available to an organization with respect to its GHG emissions and energy dependence, as determined by a forward-looking assessment.

The Bilan Carbone® process

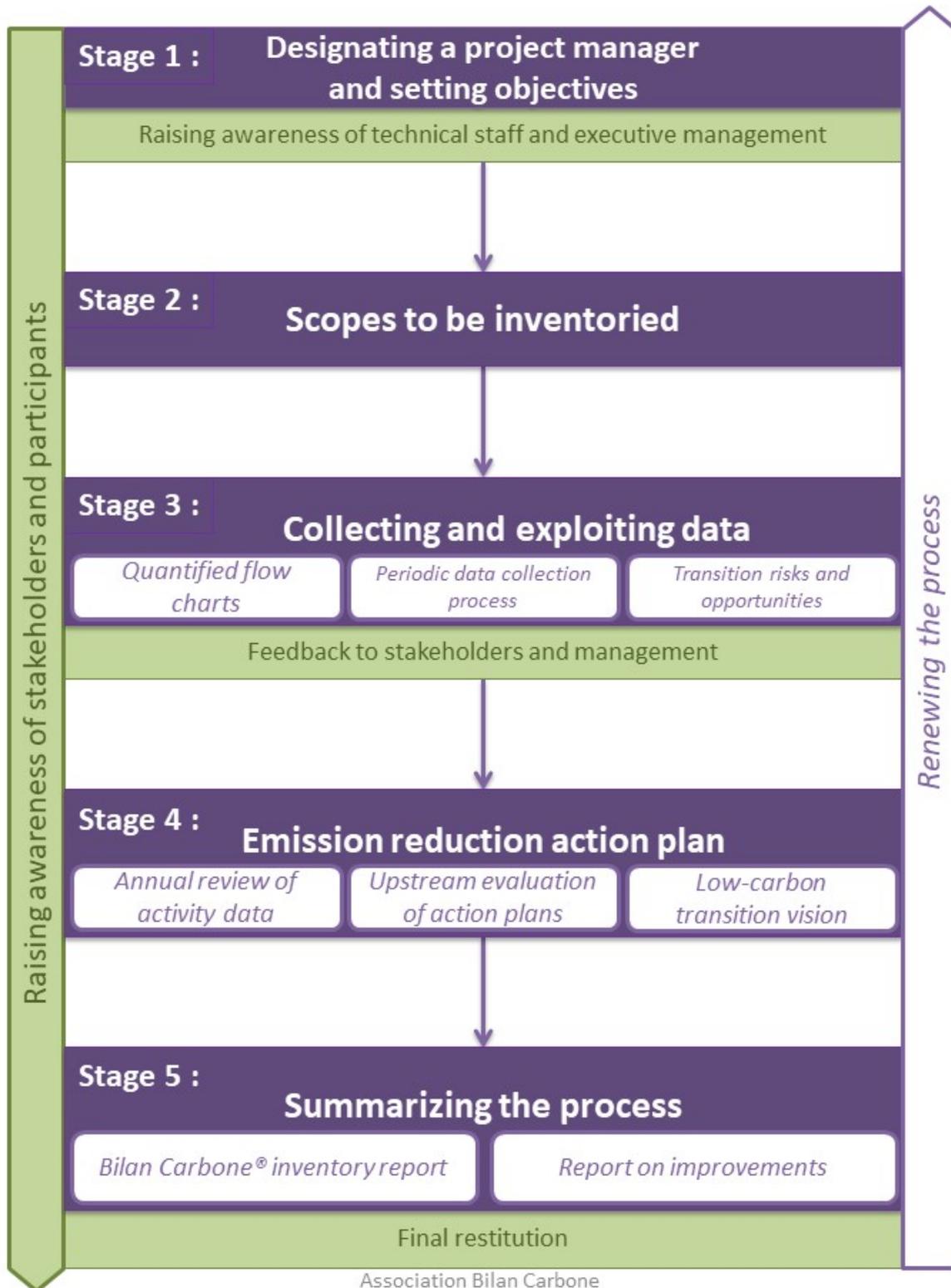


Figure 1: **The Bilan Carbone® process**

- **Stage 1:** Designating a project manager and setting objectives for the Bilan Carbone® process

The Bilan Carbone® process requires first of all that the organization's management make a commitment to determine and write up its objectives and to nominate a person to lead and "own" the assessment process.

- **Stage 2:** Determining the inventory boundaries

The organization must first map the streams of energy, raw materials, waste, inputs and outputs to be covered in the emission accounting process.

The **organizational scope** refers to all the organization's sites and installations that are to be assessed.

The **operational scope** refers to all the direct and indirect emissions generated by the organization's activity that will be included in the assessment.

The **time frame** of the Bilan Carbone® inventory is the period considered for accounting, typically one year, to best reflect the organization's activity in its totality. An inventory may also be conducted for a specific period, for instance the time frame of an event or project, for the purposes of making a specific decision.

- **Stage 3:** Collecting and exploiting data

The Bilan Carbone® project manager compiles a list of all the data, internal and from outside of the organization, that will be needed to calculate emissions for the assessment scopes.

  *Going further:* establish a data collection procedure to periodically update calculations and review emission reduction measures;

  *Going further:* quantify streams charted using the activity data collected;

Data units are converted to CO₂ equivalent units. Emissions are calculated and grouped by category. An initial analysis reveals the categories that call for immediate action. If the organization has conducted an earlier assessment, this analysis includes a comparison with the previous findings.

  *Going further:* determine risks and opportunities in specific areas, depending on the organization's needs and goals; e.g. energy dependence, future carbon tax liability, public image, etc.

Initial feedback on the Bilan Carbone® process, the first figures and outlook for high-priority action on emissions are submitted to technical committees and then to executive management for review. The measures taken are presented at these reviews and the committees involved in planning action for the following stage.

- **Stage 4:** drawing up an action plan to reduce emissions

After the initial review recommendations and one or more action plans are drafted. Indicators are chosen to monitor emission reduction action.

  *Going further:* upstream evaluation of the action plan;

  *Going further:* looking to a low-carbon transition. How is the organization positioned for the energy-climate transition?

  *Going further:* annual review of activity data to make it easier to take action.

- **Stage 5:** Summary of the Bilan Carbone® process and inventory

The outcomes of the Bilan Carbone® process are a quantitative inventory of the GHG emissions of the organization, stated by emission category within the scopes considered, and at least one action plan to address these emissions, along with the associated indicators for monitoring action. The action plan based on the inventory includes at least one measure intended to improve the process.

- **Measures to raise awareness:**

These measures are carried out as the project goes forward, especially in stages 1 and 3. These measures can be integrated into the action plan based on the inventory in order to facilitate action to reduce emissions.

In several stages:

- 1) Ongoing action to raise awareness of internal stakeholders and familiarize them with the stakes of the energy-climate transition, in order to ease the passage to action;
- 2) Stage 1: familiarizing the project manager and technical staff with the Bilan Carbone® process
- 3) Stage 3: familiarizing resource persons in company departments and at the executive level

1 Starting a Bilan Carbone® inventory

1.1 Designating a project manager for the Bilan Carbone® process

The Bilan Carbone® process must be supported by the organization's executive management and conducted by an in-house project manager who is employed by the organization, nominated by management and possibly assisted by internal staff and/or an outside consultant.

1.2 Determining the objectives of the Bilan Carbone® process

The organization must establish and provide justification for its objectives.

Implementation of a Bilan Carbone® process may be motivated by a request from stakeholders, by a regulatory obligation to quantify GHG emissions, or by a decision to commit to climate change mitigation.

The organization must explain how it aims to achieve the stated objectives.

- A Bilan Carbone® inventory can be conducted internally, with a team under a project manager who has been trained to use the method.
- The organization can seek the support of a consulting firm specialized in the use the Bilan Carbone® method to conduct the assessment, if the organization's staff does not have the required skills or availability.

This decision will depend on the organization's goal; a one-time project is more easily conducted by a consulting firm, while a long-term process should be "owned" internally.

The Bilan Carbone® accounting process will be most effective if the inventory is conducted annually. Organizations may choose another time frame, however.

For example, in France local authorities must submit a regulatory GHG inventory every three years, and companies every four years.⁶

To renew the process, the organization must refer to the measures for improvement decided in the previous cycle.⁷

⁶ More information can be found at <https://www.legifrance.gouv.fr/>

⁷ See 5.1.3 – Report on improvements to the Bilan Carbone® process

1.3 Information and awareness

To facilitate concrete action, the Bilan Carbone® process calls for all staff and stakeholders in the organization to be familiarized with energy and climate change issues, as well as with the Bilan Carbone® project and the resulting action plan(s).

The organization must take steps to raise the awareness of the in-house project manager and the designated technical staff, starting with Stage 1. This stage must prepare data collection.⁸

Some examples: the stakes involved in climate change; the scientific underpinnings of carbon accounting; history and outlook of regulatory policy; possible voluntary commitments in the organization's activity sector, etc.

To reinforce the organization's strategy all its stakeholders – employees, suppliers, customers, etc. – must be made aware of the issues at stake.

Some examples: climate change and depletion of fossil energy resources; the Paris Agreement and the energy transition; carbon accounting and corporate commitments; action within and outside of the organization, etc.

⁸ See 3 – Collecting and exploiting data

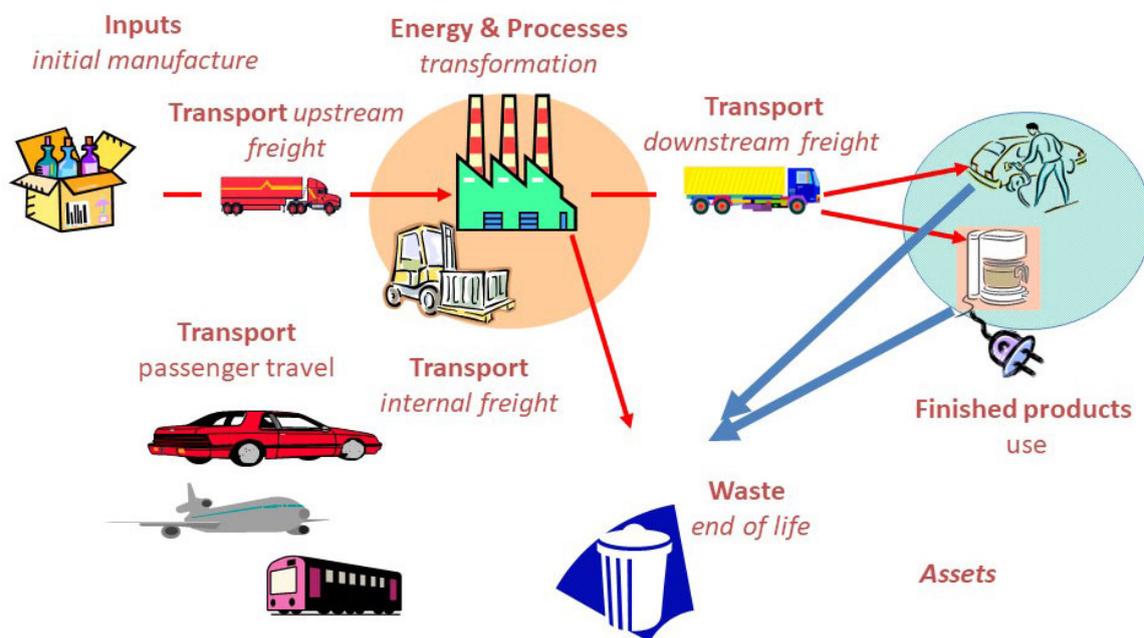
2 Overall inventory scopes

2.1 Flow charts

The organization must establish a flow chart of all streams of energy and materials induced and consumed for the purposes of its activity.

The flow chart is necessary for setting the boundaries of the scopes to be covered.

The streams to be charted are energy, raw materials, waste and finished products, according to the model below:



This flow chart will facilitate action to foster a circular economy, in order to reduce emissions by the organization and its stakeholders.

2.2 Organizational scope

The emissions covered must reflect the activity carried out by the organization, and not simply its legal structure.

The Bilan Carbone® inventory is based on the ISO 14064-1 standard. Accordingly it offers two options for the organizational scope:

- "Share of capital": emissions linked to assets and activities are included in proportion to the financial participation held by the organization.
- "Control":
 1. "Financial control": Emissions of installations under the organization's financial control (share of capital >50%) are included.
 2. Operational control: Emissions from installations operated by the organization are taken into account.

For organizations that own and operate their assets in full there is no difference between financial control and operation control.

International Financial Reporting Standards (IFRS standards) define "control" as the power to decide the financial and operational policy of an entity in order to benefit from its activities.

Table 1: Example of choice of organizational scope

Organization A, in conjunction with Organization B, is conducting a Bilan Carbone® inventory.	Organizational scope	Emissions covered
Share of capital	A owns 30% of B's total capital	30% of B's total emissions are attributed to A.
Financial control	30% of B's installations are financially controlled by A.	A's emissions include 100% of emissions from the installations it controls.
Operational control	30% of B's installations are operated by A.	A's emissions include 100% of emissions from the installations it controls.

Emissions generated by delegated public service agents and holders of public contracts are consolidated in the emissions of the contracting local authority within the limits of its jurisdictional competence.

By default the "operational control" scope is to be used as the organizational scope. Any other option must be justified by the organization.

2.3 – Operational scope

The ISO 14064-1 standard makes a distinction between direct emissions, from sources controlled by the organization, and indirect emissions from outside sources that are necessary for the organization's activities.

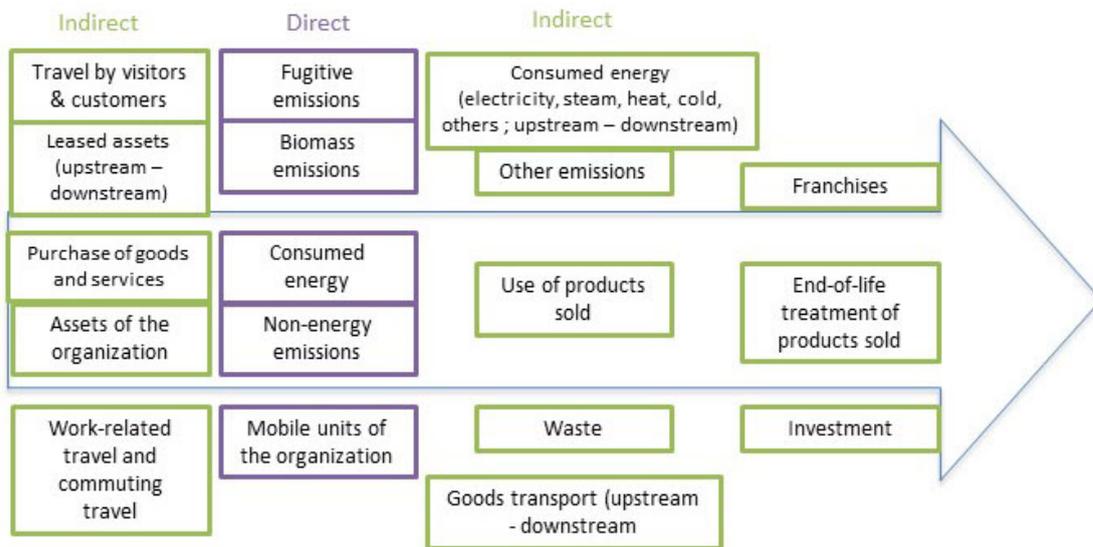


Figure 2: Diagram of emission categories, constituting the operational scope of an organization, over entire product lifespan

The Bilan Carbone® inventory must cover all direct and indirect emissions.

2.4 Time frame

The Bilan Carbone® inventory must quantify the emissions of an organization over a given period of time, the time frame of the process.

The recommended time frame is one year, to facilitate accounting and create a carbon-aware culture within the organization. A "real-time" inventory can be conducted for a specific event, or for several different GHG scenarios pertaining to a specific project, by selecting the appropriate organizational and operational scopes and time frames.

3 Collecting and exploiting data

3.1 Emission quantification method

The Bilan Carbone® inventory relies on an organization's activity data and on a database of emission factor (EF) coefficients used to convert activity data into CO₂ equivalent units.⁹

Example of activity data: amount of a raw material consumed in the year in question.

Data collection is the most time-consuming phase of the inventory process. The following recommendations are given to make this task as efficient as possible.

- Characterize the data to be gathered for the selected scopes;
- Determine their availability (reliability, units employed, etc.);
- Establish a balance between the collection effort and your objectives: data that are highly uncertain (statistical averages, for instances) are often easy to find, but are not recommended;
- Designate resource persons for each emission category;
- Document and record activity data before doing any calculations, so as to have raw data available when the inventory is repeated.

Data collection consists in gathering activity data and the corresponding emission factors.

The organization must use verifiable activity data that are representative of its activities within the scopes selected.

Emission factors must be verifiable and consistent with the type of activity data.

A Bilan Carbone® inventory must include accounting for the GHGs listed in the Kyoto Protocol: CO₂, CH₄, N₂O, SF₆, NF₃, HFCs and PFCs.

The inventory must also cover non-Kyoto GHGs (including CFCs) and the effects of high-altitude water vapour.

⁹ See Annex 2.3 – Managing emission factors and geographical application

The calculation formula is:

$$\text{GHG emissions} = \text{activity data} \times \text{the corresponding emission factor}$$

This yields an "estimated quantification" because both activity data and emission factors carry a degree of uncertainty.

Organizations may use their own emission factors.¹⁰ Organizations may also choose to use measured emissions in the Bilan Carbone® inventory, with an indication of their degree of uncertainty.

The aim is to minimize uncertainty for the emissions taken into account.¹¹

The uncertainty attached to the emission figures given must be specified.

¹⁰ See Annex 2.3 – Managing emission factors and geographical application

¹¹ See Annex 1.2 – Managing uncertainty

3.2 GHG profile of the organization

The GHG profile of the organization must match the profile outlined by ISO 14064-1.

Example: ISO 14064-1: 2006 and ISO 14069:2013 list the following 23 categories:¹²

Direct emissions	Stationary combustion units
	Mobile combustion units
	Non-energy processes
	Fugitive emissions
	Land use, land use change and forestry (LULUCF)
Indirect emissions	Electricity consumption
	Steam use, heating and cooling
	Energy drawn from a physical grid (other than electricity)
	Purchased products
	Assets
	Waste
	Goods transport (upstream)
	Work-related travel
	Leased assets (upstream)
	Investment
	Travel by customers and visitors
	Goods transport (downstream)
	Use of products sold
	End-of-life treatment of products sold
	Franchises (downstream)
	Leased assets (downstream)
	Commuting travel by employees
	Other emissions not included in the above categories

Emissions are entered only once, in a single category.

Each category is described in greater detail in the annexes.¹³ The ISO categories are the ones most widely used for reporting purposes.

¹² See ISO/TR 14069:2013, 5.2.2 *Categorization of emissions and removals*

¹³ See Annex 1.1 – Quantification of emissions

3.3 Major emission categories

International standards, and some national regulations (for example, the French Energy Transition for Green Growth Act) stipulate that the emission categories that are most significant for the organization must be identified.

In a Bilan Carbone® inventory major emission categories should be defined only on the basis of their weight in the organization's GHG profile. To determine this preponderance at least one full Bilan Carbone® inventory must have been conducted previously.

The organization's objectives should include uncovering activity data that were previously unknown.

Listing major emission categories will help identify the most effective measures for reducing GHG emissions released by the organization. Organizations can refer to sectoral studies such as those conducted by ADEME and by professional bodies for advice on determining the most significant categories for their activity.¹⁴

3.4 Carbon sinks, reservoirs and offsets

Organizations can identify GHG sinks and reservoirs that capture and store GHG, preventing their release to the atmosphere (forest growth, soil conservation, etc.).

Organizations can identify GHG emissions that would be avoided by a given reduction measure. The Bilan Carbone® methodology does not deal with avoided emissions, unlike other methods such as the ADEME method for quantifying GHG emission reduction measures.¹⁵

Avoided emissions are not deducted from an organization's total emissions, but the organization can calculate them and report them separately, as the case may be.

GHG sinks and carbon offsets are not included in the organization's Bilan Carbone® inventory.

¹⁴ See website: www.bilans-ges.ademe.fr/fr/ressource/guide-sectoriel-list/index

¹⁵ See website: www.bilans-ges.ademe.fr/fr/accueil/contenu/index/page/evaluer+ses+actions

3.5 Raising awareness and interim progress report

To foster steps to take concrete action, the Bilan Carbone® process requires that all participants be made aware of climate change and energy use issues.

Organizations must implement measures to raise awareness, of resource persons in their departments and at the executive management level.

Technical committee(s): explanation of the inventory process; presentation of figures (overall GHG emissions, major categories); review of action under way at the organization; involvement in subsequent phases (for example, joint elaboration via workshops).

Executive level: review of inventory objectives; presentation of figures (overall GHG emissions, major categories); review of action under way at the organization, and of the organization's strategy regarding the energy-climate transition (if any); involvement in subsequent phases.

Some examples: the stakes involved in climate change; the scientific underpinnings of carbon accounting; history and outlook of regulatory policy; possible voluntary commitments in the organization's business sector, etc.

Again, to reinforce the organization's action all its stakeholders – employees, suppliers, customers, etc. – must be made aware of the issues at stake.¹⁶

3.6 Going further – annual data collection, flow charts, transition risks and opportunities

3.6.1 Periodic collection of activity data

The organization should set up a process for periodic collection of activity data to enhance its carbon accounting, striving to make collection quicker and more effective, and to obtain better information.

This process helps instill a "climate culture" in the organization, facilitating implementation of emission reduction measures.

To begin with, the annual data compilation can concentrate on collecting data on the major emission categories in the organization's profile. The remaining categories can be inventoried as the organization gains experience with carbon issues.

3.6.2 Quantitative flow charts based on the data collected

The organization should draw up a flow chart quantifying all energy and materials streams that are necessary for and generated by the organization's activity, following the steps in stage 2.¹⁷ The aim is to identify the streams with the highest emissions.

This flow chart can later be used for annual monitoring of activity data, in stage 4.

¹⁶ See 4 – Action plan and monitoring indicators

¹⁷ See 2.1 – Mapping streams

3.6.3 Risks and opportunities involved in transition

GHG emissions can be seen as a risk for an organization – energy dependence, future carbon tax, negative image – or as an opportunity to orient investment towards more efficient and less carbon-emitting technologies, to establish leadership in GHG innovation and solutions in a business sector, to develop positive communication on reduction measures implemented, etc.

The organization should assess the GHG risk it incurs and the opportunities offered by transition, by following these four stages.

Stage 1 Analysis of the organization's past sensitivity and exposure to carbon risks: study of past energy cost trends for the organization, energy and climate-related investments, and all other relevant questions.

Stage 2 Assessment of present and future exposure to climate and energy risks: future energy price scenarios; scenarios of changing societal obligations in terms of health, the environment, social commitments, regulations, etc.

Stage 3 Assessment of present and future sensitivity to climate and energy risks: the organization's image on energy and climate issues as seen by stakeholders; intelligence watch regarding new energy sources and energy-efficient technology; possible evolution of the organization's business model; resistance to change within the organization.

Stage 4 Classification of levels of vulnerability: ranking using a vulnerability grid (see below), on the basis of the three preceding stages and collective expertise and analysis.

The organization should create its own risk grid from the vulnerability analysis, following the model given below.

	Minor	Limited	Major	Serious
Improbable	Intelligence watch and opportunities		Anticipate	
Possible	Intelligence watch and opportunities		Anticipate	
Probable	Act		Urgent	
Practically certain	Act		Urgent	

Table 2: Table of occurrence/risk to conclude risk analysis

Each organization can characterize its own risks and opportunities, with the help of the above analysis.

With the Bilan Carbone® methodology this determination is intentionally left to the organization, as each organization will envision the low-carbon transition in its own way.

NB: The Bilan Carbone® inventory focuses explicitly on the risk and opportunities linked to the organization's GHG emissions, which touch indirectly upon the organization's vulnerability to climate change, i.e. risks of new markets, extreme physical events and phenomena, etc.¹⁸

3.6.4 Renewal – updating and comparing with the reference inventory

When renewing a Bilan Carbone® inventory the organization must follow the steps below:

- Select a reference period as base for comparison with the new GHG emissions inventory;
- Update emissions data for the reference period, verifying calculations and using more accurate emission factors;
- Use this improved reference data to establish the new GHG inventory (with the same time period).

The organization can choose to focus on the categories shown to be significant in the initial inventory. More detailed activity data and more accurate emission factors will improve the quality of the inventory and ensure that action taken is appropriate.

¹⁸ *Recommendations of the Task Force on Climate-related Financial Disclosures*, TCFD, December 2016

4 Action plan and progress indicators

4.1 Drawing up the action plan(s)

On the basis of the organization's GHG profile the Bilan Carbone® project manager proposes a series of recommendations to the internal technical committees.

These committees draw up one or more action plans to reduce GHG emissions, in keeping with the organization's GHG profile and objectives.

Short- and medium-term measures can be classed in two categories:

-  *Immediate action*: short-term measures, to launch the action plan and motivate staff;
-  *High-priority measures*: short/medium term measures to sharply reduce emissions;

One or more operational plans can be drawn up, comprising immediate and/or high-priority measures.

4.2 Establishing progress indicators to monitor emission reduction measures

Each reduction measure must be outlined in a note specifying the following information:

- 1) Objectives and targets of the measure;**
- 2) Owner(s) of the measure;**
- 3) Indicators for monitoring progress and outcomes.**

The following should also be included in the note:

- Budget and timeline for the measure;
- Detailed description of the measure and stakeholder involvement;
- Facilitating conditions and potential obstacles;

The project manager should prepare an action chart. Measures are grouped in the chart by type (immediate or high-priority) with an explanation of their relevance to strategic goals.¹⁹

A classification can be established according to the nature of the measures: awareness, low resource intensity, effectiveness, renewable energy, improved carbon accounting. The action chart will help monitor the indicators associated with each measure.

¹⁹ See 4.3.2 – Building a vision of the low-carbon transition

When renewing the Bilan Carbone® inventory the organization must review and update the progress indicators selected for the previous inventory.

This analysis will integrate the following factors:

-   Climate (e.g. update of Unified degree day)
-   Volume (e.g. changes in the activity of the organization)
-   Technology (e.g. evolution of available technology)
-   Other factors external to the organization's action plans.

Generally speaking, the analysis of a ratio (such as an indicator like $[\text{kgCO}_2\text{eq}] / [x]$) depends on knowing if/how the denominator $[x]$ has evolved.²⁰

ABC has developed a GHG management system that offers additional components for choosing measures and managing an action plan for ongoing improvement.²¹ This tool enables the organization to make its action plan(s) more effective.

²⁰ See Annex 1.5 – Establishing progress indicators

²¹ See www.associationbilancarbone.fr/les-solutions/

4.3 Going further – upstream assessment, low-carbon transition vision, monitoring activity data

4.3.1 Evaluating a measure prior to making a decision

Organizations should assess their most significant measures before they are implemented. To do so a reference scenario must be established, in order to analyse all significant impacts of the measures in terms of the reference scenario.

ADEME has developed a methodology to quantify the GHG impact of emission reduction measures that outlines the methodological aspects of this exercise.²²

4.3.2 Building a vision of the low-carbon transition

Each organization should elaborate its vision of this transition. This forward-looking exercise aims to determine how the organization will position itself for the energy-climate transition in the long term (>4 years).

The transition vision comprises:

 *Strategic outlook*: medium/long-term action to strongly reduce the organization's carbon vulnerability.

These strategic goals should underpin and drive the operational action plan(s).

The organization should consider the advantages of multi-pronged approaches when elaborating its action plan(s). The transition vision should be seen as a way to minimize risk, and as a way to seize new opportunities emerging with the energy-climate transition.

Assessing low-Carbon Transition (ACT)

This method is designed to help companies set sectoral objectives that are compatible with a 2°C transition, through an assessment of their past, current and future strategy.

Five critical questions face the company:

- 1) What does the company want to do?
- 2) How does the company plan to go about it?
- 3) What is the company doing now?
- 4) What has the company already done?
- 5) Are these actions consistent with each other?

ACT assigns a score to the company, for use by investors.

The first step in drawing up a vision of a low-carbon transition for an organization is a GHG emission inventory, but this quantification can also lead to action in terms of investment (material or intangible), management and policy with respect to all stakeholders, from employees and suppliers to customers. The transition vision will push the organization to profoundly reshape its operational model.

The Bilan Carbone® inventory is a springboard to other energy-climate transition methodologies, such as ACT.²³

²² See www.bilans-ges.ademe.fr/fr/accueil/contenu/index/page/evaluer+ses+actions

²³ *Assessing low-Carbon Transition (ACT)*, CDP – ADEME

4.3.3 Monitoring activity data

The organization defines indicators for the purpose of monitoring the activity data that are relevant to its most significant GHG emissions, so as to track the organization's performance in terms of emissions. The quantitative flow chart mapping input and output streams ideally supports this exercise.

For example, inputs and packaging materials are quantified in tonnes of cardboard, plastic, etc. Energy consumption is quantified in MWh. The relevant information for travel and shipping can be the percentages of personal cars, public transport, trucks and aircraft in the means of transport used.

Advice for choosing appropriate indicators, along with some examples, can be found in Annex 1.4 – Monitoring indicators

4.3.4 Update and renewal – monitoring ongoing action

When renewing a Bilan Carbone® inventory the organization must follow the steps below:

- Analyse changes in monitoring indicators for emission reduction measures;
- Update the low-carbon transition vision, referring to changes in transition risks and opportunities set forth in stage 4;
- Analyse the period between two inventories, and use the findings to modify the existing action plan(s).

5 Summary and final report

5.1 Summarizing the Bilan Carbone® process

The organization summarizes its Bilan Carbone® process for executive management, in a document that conforms to Bilan Carbone® principles.

The Bilan Carbone® logo should appear in this document. The organization should also draw up a Bilan Carbone® report to summarize its action, inform stakeholders and facilitate verification.

If the organization decides to draft a Bilan Carbone® report the following recommendations must be followed.

5.1.1 Typical content of a Bilan Carbone® report

The Bilan Carbone® report is prepared and drafted by the project manager. All in-house stakeholders should take part in the preparation and drafting of the Bilan Carbone® report.

Only reports that comply with Bilan Carbone® principles are entitled to display the Bilan Carbone® logo.²⁴

The organization determines the content of the report, as well as to which stakeholders it is distributed and how, according to internal and external reporting needs.

The report should include the following content, depending on the options chosen by the organization (more detailed segments given in italics below):

- a. Description of the organization conducting the Bilan Carbone® inventory;
- b. Presentation of the project manager;
- c. Input/output flow charts;
- d. Time frame chosen for the inventory;
- e. Documentation of the organizational boundaries;
- f. Justification/explanation of the organizational boundaries, as needed;
- g. *Description of the data collection process implemented;*
- h. The GHG profile of the organization, stating emissions in CO₂eq;
- i. The reference period chosen and its GHG profile;
- j. Justification for any modification of the reference period;
- k. Documentation on emission factors used;
- l. Uncertainty linked to the GHG profile;
- m. *Flow chart of energy and raw materials streams in the organization;*
- n. *GHG risks and opportunities for the organization;*
- o. Action plan(s) and the project manager's recommendations for the organization;
- p. Indicators used to monitor action taken;
- q. *Upstream assessment of action plans;*
- r. *Transition vision for the organization;*
- s. *Indicators used to monitor the organization's activity data;*
- t. *A note stating whether the Bilan Carbone® inventory has been verified by a third party.*

²⁴ See Main principles of the Bilan Carbone® methodology

5.1.2 Comparison of a Bilan Carbone® report with other accounting standards

Bilan Carbone® reports are compatible with documents required under other carbon accounting methodologies. The table below shows the correspondences between these different inventory reports.

Table 3: Content found in summary report

Items	Bilan Carbone®	ISO 14064-1:2006	GHG Protocol	French regulations
Description of the organization	X	X		X
Nomination of project manager	x	X		X
Period covered	X	X	X	X
Input/output flow chart	X			
Organizational boundaries	X	X	X	
Direct emissions	X	X	X	X
Biomass combustion emissions	X	X	X	X
Indirect energy emissions	X	X	X	X
Other indirect emissions	X	Optional	Optional	Optional
Reduction measures and uncertainties	X	X	Optional	Optional
GHG removals		X		
Motivation for exclusion of categories		X	X	Optional
Reference period	X	X	X	
Justification for any modification of reference period	X	X	X	Optional
Quantification methodology		X	X	
Justification for any modification of quantification methodology	X	X		X
Description of EF and GWP coefficients	X	X		Optional
Certified in compliance with ISO 14064		X		
Notice of third-party verification	Optional	X	Optional	
Transition risks and opportunities	Optional			
GHG strategy of the organization	Optional	Optional		Optional
Action plan(s)	X	Optional	Optional	X
Sources, sites or activities excluded			X	
Requirements of the GHG programme to which the organization is subject	Optional			
Emissions or removals broken down by installation	Optional	Optional	Optional	
Supplementary indicators	Optional	Optional	Optional	
Performance evaluation	Optional	Optional	Optional	
GHG information management methods	Optional	Optional	Optional	
Contact point			Optional	Optional

5.1.3 Report on improvements to the Bilan Carbone® process

The report on improvements provides a way for the organization to step back and look at the Bilan Carbone® process it has completed. The aim of this report is to ensure that carbon accounting continues in the organization, and is continually improved.

A report on improvements should be drawn up for each Bilan Carbone® inventory conducted.

This report must include:

1. A description of the Bilan Carbone® principles and compliance with them;
2. A description of the organization's objectives and improvements, if needed, to be made to attain them;
3. Identification of errors and omissions in emission estimates;
4. Integration of feedback on action to raise awareness implemented by the organization;
5. Proposals for improvements to the process.

Example:

Creation and improvement of an automated system for collecting activity data; inclusion of emission factors tailored to the organization, etc.

The improvements report can be reviewed in the course of an external verification of the inventory process.

5.2 Final Bilan Carbone® report

The findings of the Bilan Carbone® inventory are presented to technical staff and to executive management of the organization.

The project manager should underscore the immediate and high-priority measures to be implemented.

5.3 Going further – beyond the Bilan Carbone® inventory

If the organization wants to go further in its work to address GHG emissions, it can seek information from relevant specialized bodies.

ADEME and professional/trade federations, for example, have produced sectoral guides that include examples and advice for carbon accounting.²⁵ In this case the organization should provide documentation to explain its decision.

²⁵ See <http://www.bilans-ges.ademe.fr/fr/ressource/guide-sectoriel-list/>

6 - Bibliographical References

6.1 - Other publications on GHG emissions accounting

6.1.1 - ISO 14064-1:2006 and ISO 14069:2013

The ISO 14064-1:2006 standard sets forth the principles and requirements applicable to organizations for quantification of GHG emissions and removals. This standard is the basis for the main accounting methods, and for the regulatory methodology in France. ISO 14064 consists of three sections dealing with reporting of GHG emissions at the organization level, at the project level, and with specifications for the verification process.

ISO 14069:2013 sets forth application directives for ISO 14064-1. This standard describes the 23 categories of emissions that make up the GHG profile, divided among direct and indirect energy emissions, which are mandatory under the standard, and other indirect emissions that are optional. The standard also provides some examples of accounting.

6.1.2 - ISO 14064-1:2017 forthcoming changes

A new version of ISO 14064-1:2017 is currently under review. This version will introduce many changes, among which consideration of the degree of significance of emission categories. Emission categories will continue to be identified as direct or indirect, but this will no longer be a criterion for the choice of quantification. Six out of seven emission categories pertain to indirect emissions, which will have to be integrated into the GHG profile if they are relevant.

6.1.3 - GHG Protocol

The GHG Protocol, elaborated by the World Resources Institute (WRI) and the World Business Council for Sustainable Development (representing 170 corporations), is a GHG emission inventory method that aims to simplify and reduce the cost of a true and accurate inventory. The business-oriented dimension of this method is intended to make GHG accounting and reporting more transparent and useful.

6.1.4 - Regulatory methodology

The regulatory methodology adopted in France under the National Commitment to the Environment Act (Grenelle II legislation) in 2010 provides the components needed to draw up the GHG profile that by law must be submitted by companies with over 500 employees (every four years, as for energy audits) and by local authorities with a population of over 50,000 (every three years).

This method is directly inspired by ISO 14064-1:2006.

6.2 IPCC publications *Fifth Assessment Report (AR5)*

The Intergovernmental Panel on Climate Change (IPCC) was created in 1988 by the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP). IPCC regularly publishes reports on climate change that consolidate the work of thousands of researchers. The Fifth Assessment Report (AR5) was issued in three parts: "The Physical Science Basis" in 2013, "Impacts, Adaptation and Vulnerability" and "Mitigation of Climate Change" in 2014.

These reports state a very clear conclusion: human activities drive an exceptional increase in the concentration of GHGs in the atmosphere, transforming the climate at a pace never known in the past.

Four scenarios, called Representative Concentration Pathways (RCP) are described, to anticipate temperature trends depending on the extent of emission reduction achieved by society. RCP 8.5 is the most pessimistic, and the most likely, as it corresponds to the continuation of current trends. In concrete terms this scenario foresees an increase of up to 5.5°C in summer temperatures in mainland France, with heat waves that are two to three times more frequent. The scientific view is that warming should be held to an increase of no more than 2°C compared to the preindustrial period.

6.3 Documents published by ADEME

6.3.1 Sectoral methodology *Assessing low-Carbon Transition (ACT)*

The ACT method covers two aspects of carbon accounting: reporting and implementation of action. This method produces an extra-financial notation of the audited company, intended for investors, that aims to evaluate the company's position in relation to a "2°" sectoral trajectory. This method is largely based on the tools of Science Based Targets.²⁶

The auditor observes the company's past performance (measures already implemented), its present action (in comparison with the company's business sector) and action envisioned for the future. A three-tier score is given to evaluate the company's position in relation to its trajectory, the consistency of various indicators, and the auditor's confidence concerning the probable evolution of the score.

ACT reference data by sector also indicate measures to be taken to stay within the bounds of a "2°" trajectory, to encourage companies to take action.

6.3.2 Method for the quantification of GHG emissions related to a given measure

This GHG quantification method for project-related emissions was first developed by ADEME in 2014. The method compares a "with action" scenario to a "without action" scenario, at key moments of the project, using analysis of a tree of consequences and GHG accounting based on emission factors.

A version 2 of the method, more robust and operational, was published in 2016.

²⁶ 6.5 – Documents published by *Science Based Targets*

6.4 Recommendations of the *Task Force on Climate-related Financial Disclosures (TCFD)*

The Task Force on Climate-related Financial Disclosures (TCFD) is a business-oriented body created by the *Financial Stability Board* to develop voluntary reporting of material risks and relevant information for investors.

TCFD emphasizes four main recommendations: reported information must be usable by all types of organizations, must include elements of financial analysis, must support operational decision-making and must focus on analysis of risks and opportunities stemming from the transition to a low-carbon economy.

6.5 Documents published by *Science Based Targets*

Science Based Targets (STB) is an initiative of CDP, WRI, and the *World Wide Fund for Nature* (WWF), with support from the *United Nations Global Compact* (UNGC) and the *We Mean Business* coalition. STB aims to encourage companies to set reduction objectives in line with IPCC recommendations, and in particular with the RCP 2.5 scenario which would limit global warming to +2°C. The coalition provides several different tools so that companies can each develop their own objectives that are consistent with sectoral scenarios, such as those published by the International Energy Agency (IEA).

6.6 CDP questionnaires and reports

CDP is an NGO that disseminates an international reporting model, to companies, cities, states and regions via online questionnaires. CDP is active in 50 countries around the world. Fees are charged for the online questionnaires, and the responses analysed by CDP. Reports based on these data are issued regularly to enable global leaders (investors, purchasers, etc.) to act in consequence.

The CDP questionnaire covers emission scopes 1 and 2, and treats scope 3 in less detail. Other questions are related to governance, corporate strategy such as risk management, business activity and involvement with governments, company objectives and initiatives for emission reduction, and communication.

7 Annexes

7.1 Special calculation rules

7.1.1 Annex 1.1 Detailed presentation of emission categories

The GHG profile required for the Bilan Carbone® inventory is the ISO 14064-1 profile. The 2006 version of this standard lists 23 emission categories, described in this annex.

7.1.2 Annex 1.2 Managing uncertainty

Activity data and emission factors are imprecise; this engenders uncertainty. GHG accounting is based on multiplication of activity data by an emission factor, and then summing of all these operations to obtain an estimate of total GHG emissions. All of these operations involve manipulating the uncertainty associated with the component elements.

7.1.3 Annex 1.3 Establishing progress indicators

Progress indicators provide information that highlights changes or trends, thus helping with decision-making. Once relevant progress indicators are determined by the organization, it is tempting to establish ratios. Ratios should be used with caution, however, to avoid an erroneous interpretation of the inventory.

7.1.4 Annex 1.4 Examples from corporate entities

This real-life example is drawn from a company in the pharmaceutical sector; it has the advantage of including a drug production site, a logistics platform, administrative offices and itinerant sales staff, thus covering practically all emission categories. The process presented here describes accounting carried out by an outside consultant assisting the company that is conducting the inventory. An in-house inventory would follow the same stages, combining the steps taken by the consultant and those of the project manager in the example.

7.2 Users' guide to Bilan Carbone® V8 calculation spreadsheets

7.2.1 Annex 2.1 How to use the calculation spreadsheets

The Bilan Carbone® methodology can be applied using the spreadsheet tools published by Association Bilan Carbone.

A master spreadsheet is used to convert activity data to CO₂eq units, and also to create graphs and to export results in formats compatible with ISO standards, the GHG Protocol and French regulatory reporting standards. The spreadsheets include tabs to break down emissions by source category: energy, non-energy, inputs, future packaging, freight, transport, direct waste, assets, product use and end of life. Each tab is described in detail and includes advice on how to enter the emissions in GHG accounting.

Utilities are provided for:

- summary and archiving of the organization's activity data
- consolidation of emissions across several sites
- comparison of emissions across periods
- economic simulations
- implementation of measures to reduce emissions.

7.2.2 Annex 2.2 Extracting results

The Bilan Carbone® master spreadsheet presents the results of GHG accounting in the formats used by the major international standards (ISO, GHG Protocol, French regulatory reporting requirements). Some specific features of these different standards are discussed in this document.

7.2.3 Annex 2.3 Managing emission factors and geographical application

Emission factors (EF) are a key component of carbon accounting, as they are used to convert activity data into CO₂eq units. Users must know how to manipulate these factors in the master spreadsheet, and how to make the best use of them according to the geographic location of the sites being inventoried.

7.3 Specific features for local government authorities

8.3.1 Annex 3.1 Bilan Carbone® and the jurisdiction of territorial authorities

Bilan Carbone® accounting may be used by an territorial authority. The local authority is treated as a particular case of service provider, an organization using its own property and assets or outside means that it in effect controls. Each division, department or activity is to be treated as a distinct provider, subject to the Bilan Carbone® accounting process.

8.3.2 Annex 3.2 Example for local authorities

This example is based on a real case, and tracks the Bilan Carbone® accounting process of a medium-sized city. Municipal property, assets and jurisdiction are understood to cover public infrastructure and buildings, lighting, public worksites, distribution of drinking water, and waste collection and treatment. The process presented here describes accounting carried out by an outside consultant assisting the local authority that is conducting the inventory. An in-house inventory would follow the same stages, combining the steps taken by the consultant and those of the project manager in the example.

These components serve to draw up the Territorial Climate-Energy Plan for the city.

7.4 Annex 4 – Guidelines for drawing up terms of reference for a tender consultation

Sample terms of reference are given in this annex; they are designed to help integrate Bilan Carbone® accounting into organizations' projects. This guidance outlines the obligations of project owners upstream of the tender process, and introduces key concepts and industry leaders in GHG inventory and carbon accounting.

7.5 Annex 5 – Linking a Bilan Carbone® inventory and SM-GES®

Association Bilan Carbone deploys a GHG management system (SM-GES®) in parallel with the Bilan Carbone® method. SM-GES® comprises reference guidelines, a set of tools, and training. It is easy to understand, in order to encourage organizations to undertake GHG management, and practical so that it remains operational, and applies a demanding standard to ensure significant GHG emission reductions.

These two processes mesh, but can be used separately. The Bilan Carbone® inventory ends with implementation of GHG reduction measures; the GHG management system starts with an analysis of the organization's GHG profile (even if it has not been drawn up as part of the Bilan Carbone® process) and with construction of an action plan.

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